Proceedings of 2018 IEEE East-West Design and Test Symposium, EWDTS 2018, 2018

# Using of Interval Analysis Algorithms for Technical Systems Optimization Problem Solving

*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

## Abstract

© 2018 IEEE. The application of interval analysis methods in the mathematical modeling of technical systems and the solution of the optimal control problem makes it possible to take into account the uncertainty in the initial data. A mathematical model of the xylene isomerization process with interval kinetic parameters was developed. On the basis of the Pontryagin maximum principle, the problem of finding the optimum temperature for the process is solved. A computational experiment was performed to find the dependence of the optimal solution on the variation of the kinetic parameters.

http://dx.doi.org/10.1109/EWDTS.2018.8524746

## References

[1] Antonova O. A., Mustafina S. A., Spivak S. I. (2010) Search for the optimal temperature regime of a multistage consecutive reaction in the conditions of uncertainty of the kinetic data. Bashkir chemical journal. Ufa. 17 (3): 36-38.

[2] Spivak S. I. (2009) Informativeness of kinetic measurements. Bulletin of the Bashkir University. 14 (3 (I)): 1056-1059.

[3] Vaytiev V. A., Mustafina S. (2013) Searching of areas of kinetic parameters uncertainty of mathematical models of chemical kinetics on the basis of interval arithmetic. Bulletin of the South Ural State University. 7 (2): 99-110.

[4] Khaydarov A. G., Chepikova V. N., Kholodnov V. A., Borovinskaya E. S., Reshetilovskiy V. P. (2012) Research of sensitivity of kinetic parameters of biocatalytic process with use of an interval method. News of the St. Petersburg state institute of technology (technical university). 14: 112-114.

[5] Mustafina S. A., Vaytiev V. A., Grigoryev I. V. (2017) The method of research of the direct problem to the variation of the kinetic parameters within a given range. International Journal of Pure and Applied Mathematics. 112 (4): 805-815.